

NiceZyme View of ENZYME: EC 4.2.3.4

Official Name	
3-dehydroquinase synthase.	
Alternative Name(s)	
3-dehydroquinase synthetase. 5-dehydroquinase synthase. 5-dehydroquinic acid synthetase. dehydroquinase synthase. 3-deoxy-arabino-heptulosonate-7-phosphate phosphate-lyase (cyclizing).	
Reaction catalysed	
3-deoxy-arabino-heptulosonate 7-phosphate <=> 3-dehydroquinase + phosphate	
Cofactor(s)	
Cobalt; NAD.	
Comments	
<ul style="list-style-type: none"> The hydrogen atoms on C-7 of the substrate are retained on C-2 of the products. Formerly EC 4.6.1.3. 	
Cross-references	
BRENDA	4.2.3.4
EMP/PUMA	4.2.3.4
WIT	4.2.3.4
KYOTO UNIVERSITY LIGAND CHEMICAL DATABASE	4.2.3.4
IUBMB Enzyme Nomenclature	4.2.3.4
MEDLINE	Find literature relating to 4.2.3.4
Swiss-Prot	Q9WYI3, ARKB_THEMA; P07547, ARO1_EMENI; Q12659, ARO1_PNECA; Q9P7R0, ARO1_SCHPO; P08566, ARO1_YEAST; Q9YEJ9, AROB_AERPE; Q8U9V0, AROB_AGRT5; Q8YVQ0, AROB_ANASP; P31102, AROB_BACSU; Q8YJN9, AROB_BRUME; P57604, AROB_BUCAI; Q8K939, AROB_BUCAP; P59487, AROB_BUCBP; Q9PNT2, AROB_CAMJE; Q9A434, AROB_CAUCR; Q9PK25, AROB_CHLMU; Q9Z6M3, AROB_CHLPN; O84374, AROB_CHLTR; Q97KM3, AROB_CLOAB; Q8XMJ3, AROB_CLOPE; Q9X5D2, AROB_CORGL; P96749, AROB_CORPS; Q8X824, AROB_ECO57; Q8FCV7, AROB_ECOL6; P07639, AROB_ECOLI; P43879, AROB_HAEIN; Q9ZMF2, AROB_HELPI; P56081, AROB_HELPY; Q9CES8, AROB_LACLA; Q92A81, AROB_LISIN; Q8Y5X6, AROB_LISMO; Q9CCS4, AROB_MYCLE; P36919, AROB_MYCTU; O50468, AROB_NEIGO; Q9JVV5, AROB_NEIMA; Q9JY01, AROB_NEIMB; P57924, AROB_PASMU; P34002, AROB_PSEAE; Q9V1H9, AROB_PYRAB; Q8ZW80, AROB_PYRAE; Q8U0A8, AROB_PYRFU; Q8XV62, AROB_RALSO; Q98FY1, AROB_RHILO; Q92ME7, AROB_RHIME; Q8Z205, AROB_SALTI; P77980, AROB_SALTY; Q99U24, AROB_STAAM; Q8NWN4, AROB_STAAN; Q9KXQ6, AROB_STRCO; Q8K6M3, AROB_STRP3; Q8P036, AROB_STRP8; Q97Q56, AROB_STRPN; Q99YR3, AROB_STRPY; Q980I9, AROB_SULSO; Q96Y96, AROB_SULTO; P73997, AROB_SYNY3; Q9HLE3, AROB_THEAC; Q8RB14, AROB_THETN; Q978S6, AROB_THEVO; Q9KNV2, AROB_VIBCH; Q8PI87, AROB_XANAC; Q8P6X3, AROB_XANCP; Q9PDP5, AROB_XYLFA; Q8ZJF6, AROB_YERPE;

L1 ANSWER 42 OF 42 REGISTRY COPYRIGHT 2002 ACS
RN 37211-77-1 REGISTRY
CN Synthase, 5-dehydroquininate (3CI) (CA INDEX NAME)
OTHER NAMES:
CN **3-Dehydroquininate synthase**
CN 3-Dehydroquininate synthetase
CN 5-Dehydroquininate synthase
CN 5-Dehydroquinic acid synthetase
CN Dehydroquininate synthase
CN Dehydroquininate synthetase
CN E.C. 4.6.1.3
MF Unspecified
CI MAN
LC STN Files: AGRICOLA, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CAPLUS,
CASREACT, CIN, EMBASE, TOXCENTER, USPATFULL

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

161 REFERENCES IN FILE CA (1967 TO DATE)

5 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA

161 REFERENCES IN FILE CAPLUS (1967 TO DATE)

WEST Search History

DATE: Sunday, August 25, 2002

Set Name Query
side by side**Hit Count Set Name**
result set*DB=USPT,PGPB; PLUR=YES; OP=ADJ*

L10	L9 and l6	3	L10
L9	L8 and (glycine max or soybean)	5	L9
L8	L7 and (cdna or dna or nucleic acid or nucleotide or polynucleotide or host or vector)	29	L8
L7	3 dehydroquinase synthase or 3 dehydroquinase synthetase or dehydroquinase synthase or dehydroquinase synthetase	32	L7
L6	l5 or l4 or l3 or l2 or l1	15521	L6
L5	((536/23.2)!.CCLS.))	4391	L5
L4	((435/320.1)!.CCLS.))	12435	L4
L3	((435/252.3)!.CCLS.))	5854	L3
L2	((435/232)!.CCLS.))	350	L2
L1	((435/183)!.CCLS.)	1639	L1

END OF SEARCH HISTORY

WEST[Generate Collection](#)[Print](#)**Search Results - Record(s) 1 through 5 of 5 returned.**☐ 1. Document ID: US 20020032323 A1

L9: Entry 1 of 5

File: PGPB

Mar 14, 2002

PGPUB-DOCUMENT-NUMBER: 20020032323

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020032323 A1

TITLE: STREPTOCOCCUS PNEUMONIAE POLYNUCLEOTIDES AND SEQUENCES

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC
Draw Desc	Image										

☐ 2. Document ID: US 20020023280 A1

L9: Entry 2 of 5

File: PGPB

Feb 21, 2002

PGPUB-DOCUMENT-NUMBER: 20020023280

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020023280 A1

TITLE: Expressed sequences of arabidopsis thaliana

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC
Draw Desc	Image										

☐ 3. Document ID: US 6319696 B1

L9: Entry 3 of 5

File: USPT

Nov 20, 2001

US-PAT-NO: 6319696

DOCUMENT-IDENTIFIER: US 6319696 B1

TITLE: Process for producing L-amino acids

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC
Draw Desc	Image										

☐ 4. Document ID: US 4980285 A

L9: Entry 4 of 5

File: USPT

Dec 25, 1990

US-PAT-NO: 4980285

DOCUMENT-IDENTIFIER: US 4980285 A

TITLE: Method for producing L-amino acids

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RWMC
Draw	Desc	Image									

 5. Document ID US 4681852 A

L9: Entry 5 of 5

File: USPT

Jul 21, 1987

US-PAT-NO: 4681852

DOCUMENT-IDENTIFIER: US 4681852 A

TITLE: Novel microorganism and method

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RWMC
Draw	Desc	Image									

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Terms	Documents
L8 and (glycine max or soybean)	5

Display Format:

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WEST[Generate Collection](#)[Print](#)**Search Results - Record(s) 1 through 3 of 3 returned.**☐ 1. Document ID: US 20020032323 A1

L10: Entry 1 of 3

File: PGPB

Mar 14, 2002

PGPUB-DOCUMENT-NUMBER: 20020032323

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020032323 A1

TITLE: STREPTOCOCCUS PNEUMONIAE POLYNUCLEOTIDES AND SEQUENCES

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
Draw	Desc	Image							

[KMMC](#)☐ 2. Document ID: US 20020023280 A1

L10: Entry 2 of 3

File: PGPB

Feb 21, 2002

PGPUB-DOCUMENT-NUMBER: 20020023280

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020023280 A1

TITLE: Expressed sequences of arabidopsis thaliana

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
Draw	Desc	Image							

[KMMC](#)☐ 3. Document ID: US 4980285 A

L10: Entry 3 of 3

File: USPT

Dec 25, 1990

US-PAT-NO: 4980285

DOCUMENT-IDENTIFIER: US 4980285 A

TITLE: Method for producing L-amino acids

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
Draw	Desc	Image							

[KMMC](#)[Generate Collection](#)[Print](#)

Terms	Documents
L9 and l6	3

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=> d his

(FILE 'HOME' ENTERED AT 18:24:38 ON 25 AUG 2002)

FILE 'REGISTRY' ENTERED AT 18:25:44 ON 25 AUG 2002
L1 1 S 3-DEHYDROQUINATE SYNTHASE/CN

FILE 'HCAPLUS' ENTERED AT 18:25:50 ON 25 AUG 2002

FILE 'REGISTRY' ENTERED AT 18:25:53 ON 25 AUG 2002
SET SMARTSELECT ON

L2 SEL L1 1- CHEM : 8 TERMS
SET SMARTSELECT OFF

FILE 'HCAPLUS' ENTERED AT 18:25:53 ON 25 AUG 2002

L3 197 S L2
E GLYCINE MAX/CT
E E3+ALL
E SOYBEAN (GLYCINE MAX)/CT
E E3+ALL

L4 1 S L3 (L) (GLYCINE MAX OR SOYBEAN)

L5 25 S L3 (L) (CDNA OR DNA OR NUCLEIC ACID OR NUCLEOTIDE OR POLYNUCL

L6 17 S L5 AND PD<19980721

=> d ibik ab 1

L4 ANSWER 1 OF 1 HCAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 2000:85010 HCAPLUS
DOCUMENT NUMBER: 132:103787
TITLE: Plant genes encoding 3-dehydroquinate synthases
INVENTOR(S): Cahoon, Rebecca E.; Kinney, Anthony John; Rafalski, J.
Antoni; Rendina, Alan R.
PATENT ASSIGNEE(S): E.I. Du Pont De Nemours and Co., USA
SOURCE: PCT Int. Appl., 46 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000005387	A1	20000203	WO 1999-US16354	19990720
W: AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KF, LC, LK, LF, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TF, TT, UA, US, UZ, VN, YU, ZA, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MF, NE, SN, TD, TG				
AU 9951139	A1	20000214	AU 1999-51139	19990720
PRIORITY APPLN. INFO.:			US 1998-93611P	P 19980701
			WO 1999-US16354	W 19990720

AB This invention relates to an isolated cDNA fragments encoding a **3-dehydroquinate synthases** from corn, rice, soybean, and wheat, with similarity to the known enzyme sequence from Escherichia coli. The invention also relates to the construction of a chimeric gene encoding all or a portion of the **3-dehydroquinate synthase**, in sense or antisense orientation, wherein expression of the chimeric gene results in prodn. of altered levels of the **3-dehydroquinate synthase** in a transformed host cell. This enzyme should also be useful for high throughput screening of compds suitable for use as herbicides.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> d ibib ab 1-17

L6 ANSWER 1 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1998:457712 HCAPLUS

DOCUMENT NUMBER: 129:94526

TITLE: Removing the rate-limiting steps of the common pathway of aromatic amino acid synthesis by overexpression of genes for rate-limiting enzymes

INVENTOR(S): Frost, John W.; Snell, Kristi D.; Frost, Karen M.

PATENT ASSIGNEE(S): Purdue Research Foundation, USA

SOURCE: U.S., 49 pp., Cont.-in-part of U. S. Ser. No. 994,194, abandoned.

CODEN: USKKAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5776736	A	19980707	US 1994-257354	19940609 <--
CA 2148482	AA	19940707	CA 1993-2148482	19931209 <--
WO 9533843	A1	19951214	WO 1995-US7321	19950608 <--
RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 763127	A1	19970319	EP 1995-922268	19950608 <--
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE				
PRIORITY APPLN. INFO.:			US 1992-294194	B2 19921021
			US 1994-257354	A 19940609
			WO 1995-US7321	W 19950608

AB A method of increasing throughput of metabolites through the chorismate pathway to increase yields of arom. amino acids from producer microorganisms is described. The method involves increasing the levels of expression of genes for enzymes that can be rate-limiting by introduction of expression cassettes for the genes. The enzymes of interest include: **3-dehydroquinate synthase**, shikimate kinase, EPSP synthase, chorismate synthase, transketolase and DAHP synthase. These genes are expressed at levels that lead to no enzyme of the pathway being rate-limiting. The producers may be stably transformed by integration of the transforming **DNA** into the chromosome.

L6 ANSWER 2 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1998:219632 HCAPLUS

DOCUMENT NUMBER: 128:280231

TITLE: The 3-dehydroquinate synthase of Staphylococcus aureus and its use as a target for antibiotics in the control of infections

INVENTOR(S): Black, Michael Terence; Burnham, Martin Karl R.; Hodgson, John Edward; Knowles, David J. Ch.; Nicholas, Richard Oakly; Pratt, Julie M.; Reichard, Raymond W.; Rosenberg, Martin; Ward, Judith M.; Lonetto, Michael A.; Warren, Patrick V.; Payne, David J.; Brown, James R.

PATENT ASSIGNEE(S): Smithkline Beecham Corp., USA; Smithkline Beecham PLC

SOURCE: Eur. Pat. Appl., 34 pp.

CODEN: EPKXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 8

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 832978	A2	19980401	EP 1997-307425	19970923 <--
EP 832978	A3	19991124		
F: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
JP 10191987	A2	19980718	JP 1997-299291	19970924

WO 9837918 A1 19980403 WO 1998-US4483 19980227
W: CA, JP, US
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE
EP 968293 A1 20000105 EP 1998-911515 19980227
R: BE, CH, DE, DK, FR, GB, IT, LI, NL
JP 2001516211 T2 20010925 JP 1998-537965 19980227
US 6165462 A 20001226 US 1999-345603 19990629
US 6248576 B1 20010619 US 2000-493459 20000128
US 2002064848 A1 20020530 US 2001-805848 20010314
US 2002082234 A1 20020627 US 2001-939980 20010827

PRIORITY APPLN. INFO.:

US 1996-37030P P 19960924
US 1997-39209P P 19970228
US 1997-910505 A3 19970804
US 1997-918249 A3 19970825
US 1997-936165 A3 19970923
WO 1998-US4483 W 19980227
US 2000-493459 A3 20000128

AB A 3-dehydroquinate synthase of *Staphylococcus aureus* and the gene encoding it are characterized. The gene for the enzyme is strongly expressed during infection and as such it may be a useful target for the development of new antibiotics or as antigen in vaccines.

L6 ANSWER 3 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1998:126266 HCAPLUS

DOCUMENT NUMBER: 128:189292

TITLE: Genomic DNA sequences of *Streptococcus pneumoniae* strain 0100993, their predicted protein products, and their diagnostic and therapeutic uses

INVENTOR(S): Black, Michael Terence; Hodgson, John Edward; Knowles, David Justin Charles; Lonetto, Michael Arthur; Nicholas, Richard Oakley; Stodola, Robert King

PATENT ASSIGNEE(S): Smithkline Beecham Corporation, USA; Black, Michael Terence; Hodgson, John Edward; Knowles, David Justin Charles; Lonetto, Michael Arthur; Nicholas, Richard Oakley; Stodola, Robert King

SOURCE: PCT Int. Appl., 640 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 13

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9806734	A1	19980219	WO 1997-US14436	19970815 <--
W: JP, US				
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 956289	A1	19991117	EP 1997-938354	19970815
R: BE, CH, DE, DK, FR, GB, IT, LI, NL				
JP 2000514308	T2	20001031	JP 1998-510078	19970815
US 6310193	B1	20011030	US 1997-940572	19970930
US 6165762	A	20001226	US 1997-958668	19971027
US 5932701	A	19990803	US 1997-978458	19971125
US 6284878	B1	20010904	US 1997-991023	19971215
US 6171835	B1	20010109	US 1999-385288	19990830
US 6348578	B1	20020219	US 1999-417511	19991014
US 2002091236	A1	20020711	US 2001-861345	20010518

PRIORITY APPLN. INFO.:

US 1996-24022P P 19960816
US 1997-37536P P 19970210
US 1997-889711 A2 19970708
US 1997-911503 A2 19970815
WO 1997-US14436 W 19970815
US 1997-958668 A3 19971027
US 1997-977555 A3 19971125
US 1997-978454 A3 19971125

AB Newly identified polynucleotides, polypeptides encoded by such polynucleotides, the uses of such polynucleotides and polypeptides, as

well as the prodn. of such polynucleotides and polypeptides and recombinant host cells transformed with the polynucleotides, are provided. Thus, 322 DNA fragment sequences and 392 encoded protein sequences are provided that are expressed by *Streptococcus pneumoniae* strain 0100993 during infection. Because each DNA sequence contains an open reading frame (ORF) with appropriate initiation and termination codons, the encoded protein upon expression can be used as a target for the screening of antimicrobial drugs. This invention also relates to inhibiting the biosynthesis or action of such polynucleotides or polypeptides and to the use of such inhibitors in therapy.

L6 ANSWER 4 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1998:49863 HCAPLUS
DOCUMENT NUMBER: 128:138410
TITLE: *Salmonella typhimurium* *aroB* mutants are attenuated in BALB/c mice
AUTHOR(S): Gunel-Ozcan, Aysen; Brown, Katherine A.; Allen, Andrew G.; Maskell, Duncan J.
CORPORATE SOURCE: Department of Biochemistry, Imperial College of Science, Technology and Medicine, London, SW7 2AY, UK
SOURCE: *Microbial Pathogenesis* (1997), 23(5), 311-316
CODEN: MIPAEV; ISSN: 0882-4010
PUBLISHER: Academic Press Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The *aroB* gene of *Salmonella typhimurium*, encoding **dehydroquinase synthase**, has been cloned into pUC19 and the DNA sequence detd. The *aroB* gene was isolated from a cosmid gene bank by complementation of an *Escherichia coli* *aroB* mutant and screening by Southern blot anal. The **nucleotide** sequence of the *S. typhimurium* *aroB* gene revealed the presence of an open reading frame, encoding a protein of 360 amino acids with a calcd. mol. mass of 38696 Daltons. The amino acid sequence of *S. typhimurium* **dehydroquinase synthase** is nearly identical to the *Escherichia coli* homolog and shows high homol. with other *aroB* gene products from other organisms. Subsequently, a stable insertional mutation in *aroB* was introduced into the wild-type *S. typhimurium* C5 strain. This mutant was auxotrophic for arom. compds. Infection of BALB/c mice with this mutant demonstrated attenuation comparable to other *S. typhimurium* mutants unable to biosynthesize arom. amino acids.

L6 ANSWER 5 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1997:687083 HCAPLUS
DOCUMENT NUMBER: 128:84906
TITLE: Cloning and functional characterization of the genes encoding 3-dehydroquinase synthase (*aroB*) and tRNA-guanine transglycosylase (*tgt*) from *Helicobacter pylori*
AUTHOR(S): Bereswill, S.; Fassbinder, F.; Volzing, C.; Haas, R.; Reuter, K.; Ficner, R.; Kist, M.
CORPORATE SOURCE: Abteilung Mikrobiologie und Hygiene, Institut für Medizinische Mikrobiologie, Hermann-Herder-Strasse 11, Freiburg, D-79104, Germany
SOURCE: *Medical Microbiology and Immunology* (1997), 186(2-3), 125-134
CODEN: MMIYAC; ISSN: 0300-8584
PUBLISHER: Springer
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The *aroB* gene from *Helicobacter pylori* strain P1 was cloned and further characterized by sequence anal. and by functional complementation of the *aroB* mutation in *Escherichia coli*. The *aroB* gene encodes the enzyme 3-dehydroquinase synthase which catalyzes one of the early steps in the shikimate pathway. This pathway, which creates arom. mols. from sugar precursors, is present in prokaryotes, fungi and plants but is absent from mammalian cells. The predicted amino acid sequence of the *H. pylori* *aroB*

gene product showed significant homol. (30 - 40 identity and 50 - 60 similarity) to 3-dehydroquinate synthases from various other prokaryotes and eukaryotes. The single gene on a plasmid was biol. active in *E. coli*. It suppressed the specific phenotype of *aroB* mutants by restoring the shikimate pathway-dependent synthesis of arom. amino acids and the prodn. of the siderophore enterobactin. Two other reading frames were found adjacent to the *aroB* gene. The first, designated as *orf1*, had no significant homol. to proteins and genes present in databases, whereas the second was found to share a significant degree of homol. with the *tgt* gene encoding tRNA-guanine transglycosylase from a variety of other bacteria (40 - 50 identity and 60 - 70 similarity). The function of the *tgt* gene was confirmed by heterologous complementation. The gene on a plasmid was shown to complement the queuosine biosynthesis defect in a genetically defined *tgt*- strain of *E. coli*. The presence of the *aroB* gene and the putative *tgt* homolog in unrelated *H. pylori* strains was confirmed by Southern blot hybridization and by polymerase chain reaction with specific primers.

L6 ANSWER 6 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1997:482757 HCAPLUS
 DOCUMENT NUMBER: 127:233226
 TITLE: Attenuation and vaccine potential of *aroQ* mutants of *Corynebacterium pseudotuberculosis*
 AUTHOR(S): Simmons, Cameron P.; Hodgson, Adrian L. M.; Strugnell, Richard A.
 CORPORATE SOURCE: CRC for Vaccine Technology and Department of Microbiology and Immunology, University of Melbourne, Parkville, 3052, Australia
 SOURCE: Infection and Immunity (1997), 65(8), 3048-3056
 CODEN: INFIBR; ISSN: 0019-9567
 PUBLISHER: American Society for Microbiology
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB *Corynebacterium pseudotuberculosis*, a gram-pos. intracellular bacterial pathogen, is the etiol. agent of the disease caseous lymphadenitis (CLA) in both sheep and goats. Attenuated mutants of *C. pseudotuberculosis* have the potential to act as novel live veterinary vaccine vectors. The authors have cloned and sequenced the *aroB* and *aroQ* genes from *C. pseudotuberculosis* C231. By allelic exchange, *aroQ* mutants of both C231, designated CS100, and a *pld* mutant strain TB521, designated CS200, were constructed. Infection of BALB/c mice indicated that introduction of the *aroQ* mutation into C231 and TB521 attenuated both strains. In sublethally infected BALB/c mice, both CS100 and CS200 were cleared from spleens and livers by day 8 postinfection. The in vivo persistence of these strains was increased when the intact *aroQ* gene was supplied on a plasmid in trans. Mice infected with TB521 harbored bacteria in organs at least till day 8 postinfection without ill effect. When used as a vaccine, only the max. tolerated dose of CS100 had the capacity to protect mice from homologous challenge. Vaccination with TB521 also elicited protective immunity, and this was assocd. with gamma interferon (IFN-.gamma.) prodn. from splenocytes stimulated 7 days postvaccination. The role of IFN-.gamma. in controlling primary infections with *C. pseudotuberculosis* was examd. in mice deficient for the IFN-.gamma. receptor (IFN-.gamma.R-/- mice). IFN-.gamma.R-/- mice cleared an infection with CS100 but were significantly more susceptible than control littermates to infection with C231 or TB521. These studies support an important role for IFN-.gamma. in control of primary *C. pseudotuberculosis* infections and indicate that *aroQ* mutants remain attenuated even in immunocompromised animals. This is the first report of an *aroQ* mutant of a bacterial pathogen, and the results may have implications for the construction of arom. mutants of *Mycobacterium tuberculosis* for use as vaccines.

L6 ANSWER 7 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1996:466209 HCAPLUS
 DOCUMENT NUMBER: 125:159938
 TITLE: Cloning of a cDNA encoding a 3-

dehydroquinase synthase from a higher plant, and analysis of the organ-specific and elicitor-induced expression of the corresponding gene
Bischoff, Markus; Roesler, Jens; Raesecke, Hanns-R.; Goerlach, Joern; Amrhein, Nikolaus; Schmid, Juerg
Inst. Plant Sci., Swiss Fed. Inst. Technol., Zurich, CH-8092, Switz.

AUTHOR(S):

CORPORATE SOURCE:

SOURCE:

PUBLISHER:

DOCUMENT TYPE:

LANGUAGE:

Plant Molecular Biology (1996), 31(1), 63-76
CODEN: FMBIDB; ISSN: 0167-4412

Kluwer

Journal

English

AB **CDNA** clones for all enzymes of the prechorismate pathway of higher plants have previously been cloned, with the exception of the second enzyme of the pathway, **3-dehydroquinase synthase**. Here the authors describe the isolation of a **CDNA** encoding a **3-dehydroquinase synthase** from tomato which was identified by complementing a **3-dehydroquinase synthase**-deficient *Escherichia coli* strain with a tomato **CDNA** library. The deduced amino acid sequence contains a putative N-terminal plastid-specific transit peptide, and the sequence of the mature enzyme resembles those of the corresponding bacterial enzymes more than of the fungal enzymes. Sequence identity was even higher between the tomato and *E. coli* sequences than between the *E. coli* and other known bacterial sequences. The abundance of **3-dehydroquinase synthase** transcripts differ in the organs of tomato plants analyzed. In cultured tomato cells, the abundance of **3-dehydroquinase synthase** transcripts increased 9-fold within 4 to 5 h of elicitor treatment.

L6 ANSWER 8 OF 17 HCAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1996:76630 HCAPLUS

DOCUMENT NUMBER: 124:108964

TITLE: Deblocking the common pathway of aromatic amino acid synthesis

INVENTOR(S): Frost, John W.; Snell, Kristi D.; Frost, Karen M.

PATENT ASSIGNEE(S): Purdue Research Foundation, USA

SOURCE: PCT Int. Appl., 86 pp.

CODEN: PIXXD2

DOCUMENT TYPE:

Patent

LANGUAGE:

English

FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9533843	A1	19951214	WO 1995-US7321	19950608 <--
RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
US 5776736	A	19980707	US 1994-257354	19940609 <--
EP 763127	A1	19970319	EP 1995-922268	19950608 <--
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE				
PRIORITY APPLN. INFO.:			US 1994-257354	A 19940609
			US 1992-994194	B2 19921221
			WO 1995-US7321	W 19950608

AB Enhanced efficiency of prodn. of arom. compds. via the common pathway (the shikimate pathway) of a host cell is realized by increasing the expression of enzymes acting on substrate intermediates in identified rate-limiting reaction steps in the pathway. Prokaryotic cell transformants are described comprising exogenous **DNA** sequences encoding for the enzymes **3-dehydroquinase synthase**, shikimate kinase, 5-enolpyruvylshikimate 3-phosphate synthase, and chorismate synthase. These transformants can be further transformed with exogenous **DNA** sequences encoding transketolase and DAHP synthase. In an embodiment of the present invention, .gtoreq.1 of the **DNA** sequences encoding the enzyme species are incorporated into the genome of the transformant.

L6 ANSWER 9 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1992:627292 HCAPLUS

DOCUMENT NUMBER: 117:227292

TITLE: The Mycobacterium tuberculosis shikimate pathway genes: evolutionary relationship between biosynthetic and catabolic 3-dehydroquinases

AUTHOR(S): Garbe, Thomas; Servos, Spiros; Hawkins, Alastair; Dimitriadis, George; Young, Douglas; Dougan, Gordon; Charles, Ian

CORPORATE SOURCE: MRC Tuberc. Relat. Infect. Unit, RFMS, London, W12 0HS, UK

SOURCE: Mol. Gen. Genet. (1991), 228(3), 385-92

CODEN: MGGEAE; ISSN: 0026-8925

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The M. tuberculosis shikimate pathway genes designated aroB and aroQ encoding **3-dehydroquinase synthase** and 3-dehydroquinase, resp. were isolated by mol. cloning and their **nucleotide** sequences detd. The deduced **dehydroquinase synthase** amino acid sequence from M. tuberculosis showed high similarity to those of equiv. enzymes from prokaryotes and filamentous fungi. Surprisingly, the deduced M. tuberculosis 3-dehydroquinase amino acid sequence showed no similarity to other characterized prokaryotic biosynthetic 3-dehydroquinases (bDHQases). A high degree of similarity was obsd., however, to the fungal catabolic 3-dehydroquinases (cDHQases) which are active in the quinic acid utilization pathway and are isoenzymes of the fungal bDHQases. This finding indicates a common ancestral origin for genes encoding the catabolic dehydroquinases of fungi and the biosynthetic dehydroquinases present in some prokaryotes. Deletion of genes encoding shikimate pathway enzymes represents a possible approach to generation of rationally attenuated strains of M. tuberculosis for use as live vaccines.

L6 ANSWER 10 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1992:485720 HCAPLUS

DOCUMENT NUMBER: 117:95720

TITLE: Overproduction in Escherichia coli of the dehydroquinase synthase domain of the Aspergillus nidulans pentafunctional AROM protein

AUTHOR(S): Van den Hombergh, Johannes P. T. W.; Moore, Jonathan D.; Charles, Ian G.; Hawkins, Alastair R.

CORPORATE SOURCE: Med. Sch., Univ. Newcastle upon Tyne, NE2 4HH, UK

SOURCE: Biochem. J. (1992), 284(3), 861-7

CODEN: BIJOAK; ISSN: 0306-3175

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The pentafunctional AROM enzyme of A. nidulans is encoded by the complex aromA locus and catalyzes steps 2-6 in the synthesis of chorismate, the common precursor for the arom. amino acids and p-aminobenzoic acid. **DNA** sequences encoding the **3-dehydroquinase synthase** (DHQ synthase) and 3-dehydroquinase domains of the AROM enzyme were amplified with the inclusion of a translational stop codon at the C-terminus by polymerase chain reaction (PCR) technol. These amplified fragments of **DNA** were subcloned into prokaryotic expression vector pKK233-2 and expressed in E. coli. As a result, the DHQ synthase domain was overproduced in E. coli, forming 30% of total cell protein, and could be purified to >80% homogeneity by a simple 2-step protocol. The 3-dehydroquinase domain was produced at a specific activity 8-fold greater than the corresponding activity encoded by the aromA gene in A. nidulans. The qutB gene of A. nidulans encoding quinate dehydrogenase was similarly subjected to PCR amplification and expression in E. coli. The quinate dehydrogenase was not overproduced, but was active in E. coli as a shikimate dehydrogenase, as the presence of the qutB gene allowed the growth of an E. coli mutant strain lacking shikimate dehydrogenase on minimal medium lacking arom. amino acid supplementation.

L6 ANSWER 11 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1988:162349 HCAPLUS
 DOCUMENT NUMBER: 108:162349
 TITLE: Cloning of a gene cluster of *aroB*, *aroE* and *aroL* for aromatic amino acid biosynthesis in *Brevibacterium lactofermentum*, a glutamic acid-producing bacterium
 AUTHOR(S): Matsui, Kazuhiko; Miwa, Kiyoshi; Sano, Konosuke
 CORPORATE SOURCE: Cent. Res. Lab., Ajinomoto Co., Ltd., Kawasaki, 210, Japan
 SOURCE: Agric. Biol. Chem. (1988), 52(2), 525-31
 CODEN: ABCHA6; ISSN: 0002-1369
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB The *aroL* gene, encoding shikimate kinase of *B. lactofermentum*, a coryneform glutamic acid-producing bacterium, was cloned. Recombinant plasmids contg. the *aroL* gene caused elevated levels of shikimate kinase synthesis in *B. lactofermentum*. In addn. to the *aroL* gene, the *aroB*, and *aroE* genes, (encoding **dehydroquinase synthase** and shikimate dehydrogenase, resp.) also exist on these recombinant plasmids. The *aroL*, *aroB*, and *aroE* genes of *B. lactofermentum* are located closely on the cloned **DNA** fragment, in that order. At least these *aro* genes form a cluster on the chromosome *B. lactofermentum*.

L6 ANSWER 12 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1987:571018 HCAPLUS
 DOCUMENT NUMBER: 107:171018
 TITLE: Complex pyridine nucleotide-dependent transformations
 AUTHOR(S): Frey, Perry A.
 CORPORATE SOURCE: Coll. Agric. Life Sci., Univ. Wisconsin, Madison, WI, USA
 SOURCE: Coenzymes Cofactors (1987), 2(Pyridine Nucleotide Coenzymes, Pt. B), 461-511
 CODEN: CONCEG
 DOCUMENT TYPE: Journal; General Review
 LANGUAGE: English

AB A review with 117 refs., of enzymic reactions, such as epimerizations, aldol reactions, cyclizations, .alpha.,.beta.-elimination-addns., and decarboxylations, in which enzyme-bound pyridine **nucleotide** prosthetic groups play the role of transient dehydrogenating agents. UDP-galactose 4-epimerases, nucleoside diphosphate oxidoreductases, adenosylhomocysteine hydrolase, ornithine cyclase, **dehydroquinase synthase**, myo-inositol 1-phosphate synthase, and urocanase are among the enzymes discussed.

L6 ANSWER 13 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1986:455400 HCAPLUS
 DOCUMENT NUMBER: 105:55400
 TITLE: The complete amino acid sequence of 3-dehydroquinase synthase of *Escherichia coli* K12
 AUTHOR(S): Millar, Gary; Coggins, John R.
 CORPORATE SOURCE: Dep. Biochem., Univ. Glasgow, Glasgow, G12 8QQ, UK
 SOURCE: FEBS Lett. (1986), 200(1), 11-17
 CODEN: FEBLAL; ISSN: 0014-5793
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB The complete amino acid sequence of the *E. coli* 3-**dehydroquinase synthase** [37211-77-1] was detd. by a combined **nucleotide** and direct amino acid sequencing strategy. *E. coli* 3-**Dehydroquinase synthase** is 362 amino acids long and has a calcd. mol. wt. of 38,880. Anal. of the *aroB* **nucleotide** sequence and its 5'- and 3'-flanking regions has identified the *aroB* promoter elements and a possible 3'-terminator site.

L6 ANSWER 14 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1981:116610 HCAPLUS
 DOCUMENT NUMBER: 94:116610
 TITLE: Properties and regulation of enzymes in the shikimate

pathway of *Hansenula henricii*
-AUTHOR(S): Bode, R.; Binrbaum, D.
CORPORATE SOURCE: Sekt. Biol., Ernst-Moritz-Arndt-Univ., Greifswald,
DDR-2200, Ger. Dem. Rep.
SOURCE: Biochem. Physiol. Pflanz. (1981), 176(4),
331-43
CODEN: BPPFA4; ISSN: 0015-3796
DOCUMENT TYPE: Journal
LANGUAGE: German

AB The following enzymes were isolated from the yeast *H. henricii* by means of
(NH₄)₂SO₄ fractionation, DEAE-Sephadex A-50 and Sepharose 6B column
chromatog.: **3-dehydroquinase synthase**,
3-dehydroquinase-shikimate-NADP oxidoreductase complex, shikimate kinase,
5-enolpyruvyl shikimate-3-phosphate synthase, and quinate-DNA
oxidoreductase. The approx. mol. wts. of these enzymes were estd. using
gel filtration. Properties of the purified enzyme were studied. Kinetic
parameters and regulation of activity of enzymes were similar to those
found in higher plants and bacteria. Arom. amino acids do not regulate
activity and level of the enzymes studied.

L6 ANSWER 15 OF 17 HCAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 1378:2193 HCAPLUS
DOCUMENT NUMBER: 88:2193
TITLE: Alicyclic acid metabolism in plants. 10. Partial
purification and some properties of 3-dehydroquinase
synthase from *Phaseolus mungo* seedlings
AUTHOR(S): Yamamoto, Etsuo
CORPORATE SOURCE: Dep. Biol., Tokyo Metrop. Univ., Tokyo, Japan
SOURCE: Plant Cell Physiol. (1977), 18(5), 995-1007
CODEN: PCPFA5
DOCUMENT TYPE: Journal
LANGUAGE: English

AB **Dehydroquinase synthase** (I) from *P. mungo* seedlings
was purified 120-fold by DE-23, hydroxylapatite, and Sephadex G-100 column
chromatog. steps. The final prepr. was free of dehydroquinase dehydratase
and NAD(P)H oxidase. I required Co²⁺ and NAD as cofactors. Co²⁺ could be
replaced by Cu²⁺ at 0.1 mM, but Cu²⁺ at higher levels was inhibitory.
None of the other metal ions tested activated I. Some activity was obsd.
in the absence of added Co²⁺ and this activity was inhibited by EDTA but
not by diethyldithiocarbamate, NaN₃ or NaCN. Heavy metal ions, such as
Ag⁺ and Hg²⁺, and p-chloromercuribenzoate strongly inhibited I. Of the
pyridine **nucleotides** tested, only NAD was required for max.
activity of I. In the absence of NAD, I retained 30-40% of the activity
obtained with added NAD. The apparent K_m value for 3-deoxy-D-arabino-
heptulosonic acid 7-phosphate at pH 7.4 was .apprx.23 .mu.M. I activity
appeared to be maximal at .apprx. pH 8.5. However, the characteristics of
the enzyme were studied at pH 7.4, because of the lability of I under alk.
conditions. An Arrhenius plot of the I reaction showed a break at
.apprx.21.degree.; below this crit. temp. the activation energy increased.

L6 ANSWER 16 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1375:69639 HCAPLUS
DOCUMENT NUMBER: 82:69639
TITLE: Separability of enzymes of the common aromatic
biosynthetic pathway in *Mycobacterium phlei*
AUTHOR(S): Yapo, A.; Catala, F.; Azerad, R.
CORPORATE SOURCE: Inst. Biochim., Univ. Paris XI, Orsay, Fr.
SOURCE: Biochimie (1974), 56(8), 1145-6
CODEN: BICMBE
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The addn. of 4-6 mg of protamine sulfate/mg protein caused no significant
loss of 3-deoxy-D-arabino-heptulosonate 7-phosphate synthetase,
dehydroquinase synthetase, dehydroquinase,
dehydroshikimate reductase, shikimate kinase, or chorismate mutase.
After protamine sulfate was used for **nucleic acid**
pptn., an elution profile of these enzymes in a cell-free ext. of *M. phlei*

was obtained. The separability of these enzymes catalyzing the 5 initial steps of the common pathway of arom. amino acid biosynthesis in bacteria showed that the pathway in *M. phlei* is similar to that in other bacteria.

L6 ANSWER 17 OF 17 HCAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1968:10494 HCAPLUS

DOCUMENT NUMBER: 68:10494

TITLE: Aromatic amino acid biosynthesis.
Gene-enzyme-relationships in *Bacillus subtilis*

AUTHOR(S): Nasser, Delill S.; Nester, Eugene W.

CORPORATE SOURCE: Univ. of Washington, Seattle, Wash., USA

SOURCE: J. Bacteriol. (1967), 94(5), 1706-14

CODEN: JOBAAY

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Single step mutants of *B. subtilis* which required either 1 or all of the aromatic amino acids for growth were isolated. The relevant gene defect was detd. for each mutant by enzyme assays in vitro. A mutant deficient in each enzyme step of aromatic amino acid biosynthesis was found, with the exceptions of the shikimate kinase and the phenylalanine and tyrosine transaminases. Representative mutants carrying the defective genes were mapped by DNA-mediated transformation by reference to the aromatic amino acid gene (*aro*) cluster and, alternately, to any of the other unlinked *aro* genes. The genes coding for **dehydroquinase synthetase**, 3-enol pyruvyl-shikimate 5-phosphate synthetase, 1 form of chorismate mutase, and prephenate dehydrogenase are linked to the *aro* cluster. Except for the previously identified linkage between the genes of 3-deoxy-D-arabino-heptulosonic acid 7-phosphate synthetase and 1 species of chorismate mutase, the other genes involved in this pathway are neither linked to the *aro* cluster nor to each other. 48 references.